Reference Document RD-04

Operating Procedures
for
Ace Diversity Interchange (ADI)

Approved by the Task Force on Coordination of Operation on August 14, 2002

1.0 Introduction

ACE Diversity Interchange (ADI) is a method of regional regulation among participating Areas that can achieve a mutual reduction in regulation requirements and generator output adjustments. ADI uses the sign diversity of the Area Control Error (ACE) values of the participating Areas to achieve this mutual reduction. This procedure is in conformance with NERC control policy.

2.0 General

The NPCC and PJM **Areas** agree to exchange ACE under this procedure. (Initial participating **Areas** are ISO-New England (ISO-NE), New York ISO (NYISO), and the Maritimes). Participating **Areas** can reduce their respective regulation burdens in real time while gaining an improvement in Control Performance Standard (CPS1 and CPS2) compliance. **Areas** will be able to participate in ADI once they establish the appropriate data exchange and apply the ADI term to their respective ACE in AGC.

Each **Area** shall be responsible for the security monitoring of its own system and for the determination of the amount of ACE diversity that it is able to provide, receive or transfer. **Areas** are expected to respond to normal condition mismatches of **load** and **generation** via their internal generation control or with scheduled purchases. Transmission limits or other internal constraints that preclude the normal implementation of ADI shall be communicated immediately to the NYISO Shift Supervisor. Whenever normal implementation of the procedure is precluded, the NYISO shall notify the other participants.

The industry sign standard for ACE is used, i.e., a negative ACE indicates under generation. The ADI sign convention is such that a positive ADI allocation will make the adjusted ACE of the **Area** less negative with respect to the unadjusted ACE. The positive ADI limit will restrict the amount of positive ADI that can be allocated to make an **Area's** adjusted ACE less negative with respect to a negative unadjusted ACE. The converse is applied to positive ACE values and negative ADI allocation and limits.

Inadvertent interchange is affected by the implementation of ADI. In general the unadjusted ACE values have equal likelihood over an hour to be positive or negative. As long as the tendency to create inadvertent in a particular direction is not large and sustained then the Monthly inadvertent accounts will remain unchanged by the ADI process. ADI allocations will be monitored carefully for inequitable or inordinately

large accumulations of inadvertent. These issues will be addressed and remedied promptly.

ADI may be used to drive inadvertent among participants that have accumulated balances that are opposite in sign. Two or more ADI participants may engage in this activity. At least one participant's accumulated inadvertent balance must be opposite in sign to the other's.

3.0 Procedure

Changes to the ADI states (enable/disable) and parameters will be coordinated through the Central Controller. The Central Controller will have the authority to globally disable ADI. Following this action, all participants must be notified (via Hotline conference). Changes to individual Satellites parameters can be communicated electronically and viewed by all participants, presuming all the participants have displayed a full complement of data.

The Satellite **Areas** shall have the authority to disable their respective participation in ADI. The Central Controller will have the capability to disable any individual Satellite, but should only do so at the Satellite's request, unless there are under extenuating circumstances. Ordinarily the Central Controller would direct a Satellite to disable its ADI participation.

3.1 NYISO is established as the Central Controller. As such, the NYISO Shift Supervisor will coordinate and notify all participating **Areas** of any changes in a Satellite's ADI state.

3.2 The Central Controller shall have the authority to enable or disable ADI exchange and/or related parameters if:

- Control Performance is adversely affected by the ADI
- ADI contributes to inordinately large or inequitable accumulations of inadvertent
- Flows on the transmission system are affected adversely by ADI.
- Data received from a participating Area does not meet the data refresh criterion. (This is intended to be monitored by the EMS).

3.3 Participants may adjust their respective ADI limits and participation. All such changes must be communicated through the Central Controller. Limit changes to control inadvertent accumulations will be made simultaneously by the Central Controller and communicated to all participants.

3.4 Any participant may request that ADI be enabled or disabled globally

3.5 All actions to globally enable or disable ADI or otherwise modify ADI parameters will be communicated electronically, via Hotline, or Conference Call as appropriate. A concise reason for the change is to be given.

3.6 Participants will disable ADI participation automatically if AGC execution is paused, suspended, placed in a monitor mode, or if data quality problems result in an unreliable calculation of the unadjusted ACE

3.7 The NPCC Control Performance Working Group (CO-1) shall monitor the ADI process to determine the appropriate ADI operating parameters and to assure that reliability is not adversely affected by its use.

Prepared by: Task Force on Coordination of Operation

References: *Criteria for Review and Approval of Documents* (Document A-1)

Monitoring Procedures for Control Performance (Document C-8)

ADI Operating Concepts and Requirements (CO-1 Working Group Document, August 17, 2001)